

**REMARKS**

The present application was filed on April 30, 2001 with claims 1 through 17. Claims 1 through 17 are presently pending in the above-identified patent application. Claim 1 is proposed to be amended herein.

5           In the Office Action, the Examiner rejected claim 1 under 35 U.S.C. §102(b) as being anticipated by Tsumura (United States Patent Number 6,044,253). The Examiner also rejected claims 2, 4, and 6 under 35 U.S.C. §103(a) as being unpatentable over Tsumura in view of Okamoto (United States Patent Number 6,614,855), rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Tsumura in view of Marchok  
10 et al. (United States Patent Number 5,790,514), and rejected claim 9 under 35 U.S.C. §103(a) as being unpatentable over Tsumura in view of Okamoto, and further in view of Greenwood (United States Patent Number 6,552,626). The Examiner indicated that claims 5, 7, and 8 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims, and that claims 10-17 are  
15 allowed.

The present invention is directed to an automatic gain control technique for adjusting the gain of an IF amplifier in a communication system, such as an OFDM or DMT communication system. The gain of an RF amplifier is controlled by a known RF automatic gain control circuit that generates an RF gain value. The disclosed IF  
20 automatic gain control (AGC) circuit controls the gain of an IF amplifier in the receiver. The disclosed IF AGC monitors the RF gain value, as well as pre-FFT and post-FFT signal energy measurements performed before and after a fast Fourier transform (FFT) stage, respectively, to maintain a desired set point. The IF AGC adjusts the previous IF gain value by an amount opposite to the adjusted RF gain value, if any. If there is no RF  
25 gain adjustment, then the IF AGC will adjust the IF gain based on thresholds established for the pre-FFT and post-FFT measurements. If the pre-FFT measurement is within a desired tolerance of the pre-FFT threshold, then the IF gain will be lowered in stepped increments. Otherwise, the IF gain adjustment is the minimum of the difference between (i) the pre-FFT measurement and its threshold, or (ii) the post-FFT measurement and its  
30 threshold, multiplied by a loop gain constant.

### Independent Claim 1

Independent claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by Tsumura.

Regarding claim 1, the Examiner asserts that Tsumura discloses adjusting  
 5 said IF gain value by an amount approximately opposite to said RF gain value (FIG. 2: elements S300-S307; col. 2, lines 19-34; col. 4, line 35, to col. 5, line 37).

Applicant notes that, in the text cited by the Examiner (col.4, line 35, to col. 5, line 37), Tsumura teaches that the gains  $G_1$  and  $G_2$  are adjusted *based on the received power strength  $P_{IN}$* . Applicants also note that Tsumura teaches that “the  $G_2$   
 10 control signal is produced by a first gain controller 201 depending on the detected signal level  $L_{DET}$ , and the  $G_1$  control signal is produced by a second gain controller 202 *based on the magnitude of the  $G_2$  control signal*.” (Col. 3, lines 30-34.) Tsumura further teaches that, “more specifically, when the gain  $G_2$  is about to reach the maximum or minimum gain of the variable-gain circuit 106, the second gain controller 202 increases  
 15 or decreases the gain  $G_1$  of the variable-gain circuit 101 so that the gain  $G_2$  changes to a gain which is slightly smaller or larger than the maximum or minimum gain.” (Col.3, lines 47-52.) Thus, Tsumura actually teaches away from the present invention by teaching to first adjust the IF gain ( $G_2$ ), and then to adjust the RF gain ( $G_1$ ) based on the magnitude of the IF gain control signal ( $G_2$ ). Independent claim 1, as amended, requires  
 20 “adjusting said IF gain value *based on said monitored RF amplifier gain adjustment* by an amount approximately opposite to said RF gain value.”

Thus, Tsumura does not disclose or suggest adjusting said IF gain value based on said monitored RF amplifier gain adjustment by an amount approximately opposite to said RF gain value, as required by independent claim 1, as amended.

### Additional Cited References

Okamoto was also cited by the Examiner for its disclosure of a receiver for receiving broadcasting signals with an OFDM communication receiver. Okamoto does not disclose or suggest, however, adjusting an IF gain value based on an RF gain adjustment.

Thus, Okamoto does not disclose or suggest adjusting said IF gain value based on said monitored RF amplifier gain adjustment by an amount approximately opposite to said RF gain value, as required by independent claim 1, as amended.

Marchok et al. were also cited by the Examiner for its disclosure of a receiver for receiving broadcasting signals with an OFDM communication receiver. Marchok does not disclose or suggest, however, adjusting an IF gain value based on an RF gain adjustment.

Thus, Marchok et al. do not disclose or suggest adjusting said IF gain value based on said monitored RF amplifier gain adjustment by an amount approximately opposite to said RF gain value, as required by independent claim 1, as amended.

Greenwood was also cited by the Examiner for its disclosure of an OFDM communication system with a “method that a threshold for said signal energy measurement is established to prevent clipping.” Greenwood does not disclose or suggest, however, adjusting an IF gain value based on an RF gain adjustment.

Thus, Greenwood do not disclose or suggest adjusting said IF gain value based on said monitored RF amplifier gain adjustment by an amount approximately opposite to said RF gain value, as required by independent claim 1, as amended.

#### Dependent Claims 2-9 and 11-17

Dependent claims 2, 4, and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Tsumura in view of Okamoto, claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over Tsumura in view of Marchok et al., and claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Tsumura in view of Okamoto, and further in view of Greenwood.

Claims 2-9 and 11-17 are dependent on claims 1 and 10, respectively, and are therefore patentably distinguished over Tsumura, Okamoto, Marchok et al., and Greenwood (alone or in any combination) because of their dependency from amended independent claims 1 and 10 for the reasons set forth above, as well as other elements these claims add in combination to their base claim. The Examiner has already indicated that claims 5, 7, and 8 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims, and that claims 10-17 are allowed.

All of the pending claims, i.e., claims 1-17, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to  
5 contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,

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Date: November 1, 2004

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